
Neus G. Bastús

# CONCORD

## Cationic Gold nanoparticles mediated mRNA cytoplasmatic-targeted delivery for production of CAR-T lymphocytes for Chronic Lymphoid Leukemia immunotherapy

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Chimeric Antigen Receptor T (CAR T) cell therapy is a type of immunotherapy based in the ex-vivo engineering of patient's T-lymphocytes to produce special receptors on their surface that target specifically tumoral cells when re-introduced. However since today's CAR T lymphocytes stay active indefinitely, patients experience permanent eradication of B-cells and require monthly infusions of immunoglobulins for survival. To overcome this problem, mRNA transfections are increasingly used for transient protein overexpression. Unfortunately, the use of mRNA as an overexpression tool is challenging since isolated mRNA is easily degraded, and protein levels quickly decline faster. In this context, we propose to bind the mRNA to Au (solid and hollow) nanoparticles functionalized with amine terminated groups -for protein sponge and endosomal escape- as a safer way to transport mRNA to the cytosol via endocytosis. We aim to control the slow release of the loaded mRNA inside the cell, therefore extending the mRNA half-life and protein expression.